the stomach, but without much distress; there may be scarcely any pain, and some of these patients appear to be plump and well nourished. This condition has been aptly called the "hysterical stomach", and certainly the condition is one of functional irritability. Some food is retained, for the body is not wasted; the bowels are generally confined; the pulse irritable; the abdomen often fairly distended; with this state, there are other indications of nervous excitement. The determination of the patient may do an immense deal to restrain this condition, and in a young hospital patient the cure was effected by the nurse refusing to bring anything into which she could vomit. The occupation of the mind, fresh air, chalybeate tonics, free action on the bowels by aloetic and assafoetida purgatives often relieve this state. The steel may be given with advantage in a state of effervescence; in other instances, however, it is necessary to allow the stomach to rest entirely, and to feed the patient by nutrient injections. If the uterine and ovarian functions be disordered, these must, if possible, be rectified; and in the instances of married women, to which we have referred, it is often of great value to lessen pelvic irritation by opiate suppositories. It is of little use to treat one symptom while the cause of disturbance remains.

There are many other causes of peripheral disturbance of the pneumogastric nerve in the abdomen which we can only mention. Thus, in consequence of its connection with the duodenum, and with the liver and gall-bladder, we find vomiting a common symptom of many diseases of these organs. The same may be said of the kidney; a branch of the pneumogastric may be traced to the renal plexus, and the sympathy of the kidney with the stomach is due to this nervous connection as much as to the disordered secretion and altered blood. This alteration of the blood and gastric juice does not account for the vomiting and gastric disturbance which we have in calculus and some other renal affections. The function of the suprarenal capsules is still unknown, but the symptoms of a disease of this structure were well brought out in the learned lectures delivered by Dr. Greenhow last year. It is very interesting to note the very large supply of nerves distributed to this organ, and the connection of the pneumogastric with it, as explanatory of the violent vomiting, which is a prominent symptom of disease of the suprarenal capsule.

The vomiting in *peritonitis* is reflex in character, so also in those instances in which mechanical obstruction produces similar symptoms; but on these we need not dwell.

[To be continued.]

SHEFFIELD.—The last annual report for the borough of Sheffield, shows that the death-rate during the past year was equal to 26.8 per 1,000 of the population. During the same period, the birth-rate was equal to 41.6 per 1,000; and, if it could be admitted that the birth-rate so controls the death-rate, that high birth-rates produce high death-rates, Sheffield might rest contented. This theory is, however, very properly, strongly combated by Dr. Griffiths, who shows that the normal death-rate for the borough would be 21.6 per 1,000. The various causes which have tended to produce a death-rate beyond this standard, are subjected to detailed examination in a manner which must give value to the report in the locality with which it deals. Scarlet fever appears to have been very fatal, and hence the importance of isolation and of efficient disinfection are strongly insisted on. The infant mortality has also been very large. Bad dwelling accommodation evidently has its share in increasing the mortality. The borough contains localities in which wretched houses are filled to overflowing; although, in these districts, the population per acre is less than in the healthy model lodging-houses; indeed, in every way the demolition of these haunts of disease, and their replacement by more lofty and at the same time more airy dwellings, would be beneficial. The sickness and mortality which are the result of unwholesome dwellings exert, in Sheffield, as elsewhere, an enormous influence in keeping up and swelling the poor-rates, and in fostering social, moral, and physical evils. There are, however, no cellar dwellings in the borough, and, in this respect, Sheffield is better off than most of the large towns. The report shows that a large amount of work has been in progress which must tend towards improving the health of the town. The night-soil department appears to be well organised, but it is to be feared that so long as the old midden-privies remain, no efforts will do away with the evil everywhere resulting from this filthy system of excrement removal. And it is unfortunately but too notorious that, when the middens are emptied of their decomposing, and, as a rule, wet contents, the effluvia given off by the saturated brickwork, is often worse than that which arises when the structures are comparatively full. Scavenging is of course essential; but no excellence in scavenging will, in the absence of an entire reconstruction of the midden-privy, as generally seen in the north of England, effect permanent good.

THE CROONIAN LECTURES

ON

THE PATHOLOGY AND RELATIONS OF ALBUMINURIA.

Delivered at the Royal College of Physicians.

By W. HOWSHIP DICKINSON, M.D. Cantab., F.R.C.P.,

Physician and Lecturer on Pathology at St. George's Hospital;
Senior Physician to the Hospital for Sick Children; etc.

LECTURE III.

The Lardaceous Kidney.—Passing now to another form of albuminuria, we come to a change which is so widely distributed among the organs and tissues, that it is not to be limited more narrowly than by the outlines of the frame; and not only in its wide incidence does this disorder differ from those which have been discussed, but also in this: while fruitful as they are in consequent disorder, it is itself always secondary, owing no origin but in pre-existent disease. I refer to the condition which, in deference to a recommendation of the Pathological Society, I shall speak of as *lardaceous*. I need not catalogue the names which, as numerous as those bestowed upon a royal infant, mark the individual responsibilities which have been associated with it. It is enough to say that I speak of the organic change which has been spoken of as waxy, in allusion to the appearance of the affected viscera as amyloid, in view of their reaction with iodine; and as depurative, in assertion of its common origin in suppuration. The change of which the disease essentially consists is an infiltration, beginning with the arteries and afterwards penetrating widely into the tissues, of a material of which the ultimate composition is not distinguishable from that of fibrin or albumen, while its general characters are more nearly those which belong to the former of these constituents of the blood. It is not needful to recapitulate the multiplied analyses which prove what, I suppose no one now doubts, the relation of the new material to the protein bodies. The interest lies in the points of difference between this substance and the normal constituents of the body. Perhaps the most important of these is to be found in its relation to the alkalies. The presence of the lardaceous material in any tissue can be at once detected by the reaction of iodine. If, now, the weakest solution of potash or soda, or a stronger one of ammonia, be brought into contact with the infiltrated structure, its power of reacting with iodine is at once and finally abolished, and that without any destruction of the normal tissue, or even material injury to its microscopic structure. This appears to depend upon the extraordinary solubility of the morbid deposit in alkalies, a property which Dr. Marcet made use of in order to obtain it for analysis, when, at the instance of the Pathological Society, he brought his practised skill to bear upon some observations which I had recently ventured to make public. It will be seen, however, that these agents do not separate it absolutely from the healthy tissues. If part of a lardaceous organ (for example, of the liver) be exposed to the action of water until all the albumen is washed out, and it be then treated with a dilute solution of caustic potash, an enormous amount of material is at once extracted, which, on the action of an acid, will appear as a white flocculent precipitate, soluble in alkalies, but not by their carbonates, and precipitable by acids. The tissue which has yielded it no longer presents the "amyloid" reaction, and it is an obvious inference that the matter which has caused this has been dissolved out. But, as the same process extracts a less abundant but similar material from the tissue of health, the lardaceous matter is not to be isolated by this means; but it is so much more soluble than the normal structures, that it is probable that the process can be so managed as to extract the one with but little of the other. In the matter thus extracted by means of potash, Dr. Marcet found 13.7 per cent. of nitrogen as the average of three estimations; that of albumen being 15.7.

The observation that a lardaceous organ, if washed with alkali, ceased to exhibit the lardaceous reaction, led to an inquiry into the mineral constituents of the morbid deposit. Taking the liver as best suited for the purpose, the alkaline and earthy salts were ascertained in 100 grammes of liver-tissue, as removed from the body.

From the Healthy Liver (seven specimens).

Case.	Soluble Ash. (Salts of the Alkalies.)	Insoluble Ash. (Salts of the Earths.)	Potash.	Soda.
Liver of an adult, apparently natural.	.1181	.053	.187	.255
" " "	.111	.173	.23	.189
" " "	.1041	.033	.205	.252
" " "	.995	.016	.214	.192
" " "	.912	.037	.22	.25
" " "	.904	.05	.191	.123
" " "	.893	.041	.215	.164

Average percentages: Soluble Ash, or total alkaline salts, 1.00; earthy salts (chiefly phosphate of lime), .057; potash, .209; soda, .196.

From the Lardaceous Liver (eight specimens)

Case.	Soluble Ash. (Salts of the Alkalies.)	Insoluble Ash. (Salts of the Earths.)	Potash.	Soda.
Deep bed-sores. Liver in very early stage... (M. M.)	.1075	.062	.203	.177
Large vomicae. Liver slightly affected. (R. N.)	.96	.093	.256	.154
Sent from Edinburgh. Highly affected. Rather dry when examined.	.852	.21	.189	.206
From Consumption Hospital. Highly affected. Large vomicae	.677	.245	—	—
Universally infiltrated. Dysentery, syphilis, etc. (J. B.)	.633	.154	—	—
Decidedly affected. Phthisis, ulceration of bowels. (T. T.)	.621	.13	.163	.153
Intermixed with fatty change. Disease of pelvis. Discharge. (B. T.)	.614	.262	.086	.19
Decidedly affected. Suppuration from wrist. Phthisis. (J. K.)	.481	.209	.12	.053

Average percentages: Soluble ash, or total alkaline salts, .739; earthy salts (chiefly phosphate of lime), .177; potash, .169; soda, .156.

I examined the ash in these two series of instances, the one representing the condition of health, the other including various stages of lardaceous infiltration. The details are displayed. They show loss of alkaline salts, more particularly of potash, under the influence of the disease. In health the mineral constituents showed no great variation, the potash particularly ranging from .191 to .230 in 100 parts, and giving an average of .209. With the disease, the total alkaline salts and the potash singly displayed a greater variety; in the slighter examples of the change, little or not at all lessened, in the more extreme instances extraordinarily reduced. Taking an average, the total alkaline salts in health amounted to exactly 1.0 per cent.; in disease to .739 per cent. The potash in health to .209; in disease to .169. The loss of alkali is considerable, having regard to the fact that, in most instances, but a small proportion of the tissue was occupied by the deposit. It is worth noting that the earthy salts were increased. Omitting, for the present, to refer to some parallel observations which had been made upon another organ, but keeping to the liver, I am fortunately able to give the results of some analyses which were made by Dr. Dupré, at the request of the Pathological Society. Dr. Dupré ascertained the mineral constituents, in 200 grammes of liver-tissue, in three instances of health, and in three of strongly marked lardaceous infiltration. The results are exposed to view.

Saline Constituents of 100 Grammes of Liver-Tissue, as removed from the Body (Dr. Dupré).—From Three Healthy Livers.

	Potash.	Soda.	Phosphoric acid.	Chlorine.
No. 1	.3022	.1005	.2312	.1251
No. 2	.2420	.1190	.3902	.1223
No. 3	.3021	.0655	.3670	.0695

From Three Lardaceous Livers.

	Potash.	Soda.	Phosphoric acid.	Chlorine.
No. 1	.1729	.1498	.1776	.1516
No. 2 (phthisis; large vomicae) ..	.0913	.1745	.3200	.1557
No. 3 (tubercular excavation of kidney) ..	.1315	.2462	.0967	.1916

The relative deficiency of potash is more marked than in most of the instances previously referred to; and it is to be noted that with them, as in some estimations which had already been made with regard to the spleen, which have yet to be mentioned, the diminution belongs only,

as it evidently related most importantly, to this alkali. It is to be mentioned that, in the method employed by Dr. Dupré, the loss of chloride of sodium, which is inseparable from incineration, was avoided. Giving Dr. Dupré's averages as applying to 100 parts, the potash in the healthy liver was .283 per cent.; in the lardaceous liver, .151 per cent.—a diminution under disease of nearly half. The phosphoric acid at the same time is lessened, but not to an equivalent extent, from a percentage of .329 to one of .198. The chloride of sodium is increased, as it not uncommonly is in morbid formations.

I will now point to some observations of which the spleen was the subject. The results are to be seen in the tables, and speak for themselves.

Saline Constituents in 100 Grammes of Fresh Spleen.

	Earthy Salts.	Alkaline Salts.	Composition of Alkaline Salts.			
			Potash.	Soda.	Phosphoric Acid.	Sulphuric Acid.
<i>Healthy.</i>						
1. Healthy spleen	.274	1.054	.322	.115	.118	.215
2. " "	.121	1.084	.301	.230		
3. " "	.142	1.092				
<i>Lardaceous.</i>						
1. Lardaceous spleen; disease not extreme; cause unknown. (T. J.)	.216	.772	.194	.227		
2. Lardaceous, but not extremely (E. M.)	.141	.982	.124	.239		
3. Highly lardaceous (child with enormous vomicae)	.258	.658	.218	.115	.070	.049
4. Less lardaceous; phthisis; abscess of ovary	.201	.886	.245	.184	.258	.034
5. Extensively lardaceous; disease of spine, with suppuration	.354	.669	.203	.190		.071
<i>Rickety.</i>						
1. Rickety enlargement of spleen; no lardaceous reaction. (E. S.)	.094	.989	.283	.196	.055	.025

As with the liver, the variation with disease is greater than with health. The potash is constantly diminished, in one instance to less than half; on an average, from a percentage of .311 to one of .196. The soda varies much; it has apparently suffered no loss. The earthy salts were generally increased. These estimations, which nearly correspond with those made upon the liver, supply an additional fact in the contrast between the lardaceous and the rickety enlargements, of both of which the spleen is a chosen seat. The rickety condition, which is profoundly different from the lardaceous, though the two have a superficial resemblance, is distinguished from it, among other differences, by its deficiency not of potash but of lime.

I have already had to allude to the iodine reaction by which the affected tissues are distinguished; the power of exhibiting which is, in fact, the conspicuous property upon which rests the definition of the disease. The reaction simply amounts to this; whereas a solution of iodine imparts to the healthy tissues but a feeble and evanescent yellowish colour, it gives to the affected parts a deep and lasting stain, which may be as deep in colour as iodine itself. The difference is exactly that which would result from the greater absorption and retention of the test substance by the diseased than by the healthy tissue. Some observers, and earliest among them a pathologist who in his generation holds no second place—I need scarcely say that I allude to the great professor of Berlin—have described a blue colour as obtained by treating the tissue with sulphuric acid in addition to iodine. Others, however, and among them I must count myself, have failed to recognise any colour more nearly approaching blue than is iodine itself. If the solution used contain iodide of potassium, the addition of sulphuric acid will necessarily cause the deposition of iodine from the salt. Shades of colour, however, may be variously regarded, and, in view of the colour of iodine itself, differences between black and blue may be compromised. The interest which once attached to the supposed blue reaction has departed with the fancy that the morbid deposit was allied in its composition to starch. Perhaps a more obvious pathological bearing is to be discovered in the remarkable manner in which some of the normal constituents of the body may be made to yield the reaction.

A piece of an organ which has been soaked in a solution of hydrochloric acid will give a deeper tint with iodine than another which has not. If albumen be precipitated by an acid, it will be found to take and retain the colour of iodine as it will not do except when thus acidified. But the most striking counterfeit of the "amyloid" reaction can be made by operating upon fibrin. If this substance, as obtained from the cavities of the heart, be dissolved, as it can be in hydrochloric

acid diluted with six thousand times its bulk of water, it will yield on evaporation a substance, like gelatine in appearance, which gives the reaction typically, and in a manner which forms a remarkable contrast to the effect of iodine upon unsophisticated fibrin. The action of an alkali will render it again insusceptible of the lardaceous tint, and restore its original status in this respect. The affinity of iodine for this acid modification of fibrine is further shown by its forming a precipitate with it, which it is needless to say it will not do with albumen.

Whether or not this substance deserves to be called "artificial amyloid matter" (the term which I once gave it), there is at least a close analogy between it and what is deposited in the organs as the result of disease; an analogy which has been further elaborated by Dr. Marcet in the report to which I have referred.

These observations point unmistakably to the conclusion that certain constituents of the blood, which are normally in alkaline combination, undergo when in acid solution a modification which renders them liable to the amyloid reaction, or, in other words, gives them an affinity for iodine which normally they are without.

This view of the reaction is consistent with what has been already shown regarding the paucity of potash in lardaceous organs; and these considerations, taken together with the solubility of the morbid deposit in alkalis, which would seem to prohibit its deposition from blood of normal alkalinity, cannot but suggest that a deficiency of the alkaline solvent, and a consequent separation from the blood of something for the solution of which the means no longer suffice, is a rude ideal of the morbid process.

The constant presence of potash in the healthy tissues, and its apparently essential bearing upon nutrition, would prepare us to expect marked pathological results from its deficiency. Putting off for the present any reference to the organic and constitutional changes produced by the infiltration, I will say a word upon its causes and the possible manner of their operation.]

[To be continued.]

THE GOULSTONIAN LECTURES

ON

THE NATURAL HISTORY OF PULMONARY CONSUMPTION.

Delivered at the Royal College of Physicians, London.

By A. B. SHEPHERD, M.A., M.B., F.R.C.P.,

Physician to the Victoria Park Hospital for Diseases of the Chest; Assistant Physician to St. Mary's Hospital; etc.

LECTURE III.

MR. PRESIDENT, FELLOWS, AND GENTLEMEN,—Of the three forms of pulmonary consumption to which in my last lecture I drew your attention, the first is without doubt the most common; the second, mainly at the other end of life, compared with the first, succeeds it in frequency; the last is so sufficiently represented that, even omitting the distinction I have attempted to make between the syphilitic type and the other two subdivisions, it has long ceased to be a mere pathological curiosity, and claims for itself a separate clinical position.

Differing widely in their first—if I may use the word—histological origin, continuing to hold throughout their course a pathological distinction, here and there, perhaps, delicately shaded off to one type or another, the pre-eminently cheesy form is never without some fibroid induration; the bronchitic and the fibroid, perhaps, never without catarrhal products; but their result is, in the end, the same destruction of breathing surface, their clinical symptoms are almost necessarily consistent, and repeat the same portraiture of a disease which is mainly one of innutrition and increasingly imperfect assimilation. And through the web of this disease runs no longer, for us at least, the one thread of a "tubercular" product—the first generalisation of imperfect knowledge and observation. Even those who most wish to keep up its specific character are driven to allow its unspecific form, and to plead that, like products of a higher type, its appearance varies with its age; or even still, as in seeking the philosopher's stone, to search for some particular cell-form which is to be the characteristic of "tubercle".

But, however alike in their general symptoms and in the mode in which they lead to death, the three forms differ, not so much, perhaps, in their greater or less liability to catarrhal influence and catarrhal products, as in the qualities of hereditariness or acquirement. The

common judgment, not only of scientific men, has long accepted the law of hereditary predisposition to the first form of phthisis; and the hereditary character remains the same, whether it be a tendency to repeated catarrh and its results in the bronchi and alveoli, or to a supposed growth of some low destructive form called "tubercle". The *dispositio catarrhalis* of Morton (*op. cit.*, p. 77) was no empty name; the tendency even to catch cold, without any necessary phthisical process, is a matter of every-day occurrence. That very *dispositio catarrhalis* may be the only link between the two cases I quoted in my last lecture of a father dying probably of a slow bronchitic and emphysematous change in his lungs; the son, almost forty years younger, going in all likelihood more quickly to the grave with the cheesy degeneration of intra-alveolar and intrabronchial products, just as his grandfather before him had apparently gone. But, in the matter of hereditariness, the third form—that of fibroid change—can scarcely be said to agree with these two. Whatever be the poison, whether the more subtle one of alcohol or syphilis, or the rougher irritation of coal and grit, there is no evidence as yet to show that the tendency to fibroid change is one of hereditary character, although in some instances that character may be imitated by energies due to similarity of position or occupation. With the fibroid alteration found in the bodies of children affected with congenital syphilis, I have nothing to do here.

On the other hand, it is not sufficient to acknowledge the mere truth, in the ordinary form of phthisis, of a simple hereditary tendency. Not only are the writings of Sir Henry Holland, of Mr. Sedgwick and Mr. Darwin, but the every-day experience of life also, full of facts to prove that, as Mr. Sedgwick says (*Med.-Chir. Rev.*, July 1861, p. 213), "in a very large number of cases of hereditary disease, evidence is to be found of some uniformly acting and controlling influence, which is strikingly manifested in the cases..... where disease has been shown to have both its appointed sex and its appointed period to occur. So completely, indeed, has this latter fact forced itself upon the attention of the public, that we constantly find precautions being taken to guard individuals of a family prone to hereditary disease, such more particularly as phthisis, against what common observation has proved to be the dangerous period of their lives; for the friends in such cases hope that, if this period can be got over safely, the danger may be less." The aid to prognosis which may be gained from the family history may be largely increased by the knowledge of something beyond the mere existence of a certain tendency: by a knowledge of the age at which, as well as of the sex in which, this tendency had revealed itself in the ancestor.

But this very knowledge is difficult to obtain. Very often the first sign which has drawn a patient's attention to his chest has been a spitting of blood; though very often, I am compelled to admit, the hæmoptysis is absent, and the cough and dyspnoea and loss of weight have awakened him to a sense of impending mischief. My notes go to show that, in cases under the age of thirty—I had almost said twenty-five—the prognosis is better where the hæmoptysis occurs than in those in which it is absent; and the reason of this might be found in the statement of a fact (*Guy's Hospital Reports*, ser. i, vol. vi, p. 210) by my former teacher, the late Dr. Barlow, as to the almost constant occurrence of bronchitis immediately before or contemporaneously with the commencement of phthisis: "that, whether the bronchitis be the cause of the phthisis, or the phthisis of the bronchitis, the fact still remains the same, that there almost always exists a considerable hyperæmia of the bronchial mucous membrane at the commencement of phthisis"; and, to carry his assertion one step further, in some cases a considerable hyperæmia of the alveolar capillaries. And it is in these cases, very similar to, if not identical with, those classed by writers of different ages under "phthisis ab hæmoptoe", that the course of the disease is most favourable. It appears almost to stop short at the production, followed by resolution, of a local pneumonia, in which the escape of blood had something of the nature of a relief to over-distended blood-vessels; though of this local bleeding, in its further results, it would be, perhaps, too much to say simply with Cullen (*First Lines of the Practice of Physic*, Edinburgh, 1789, vol. ii, p. 372), "It is, indeed, easy to conceive that a rupture of the vessels of the lungs, like that of the vessels of the nose, may be often healed, as the surgeons speak, by the first intention." It is somewhat astonishing, at first sight, that the occurrence of hæmoptysis, supposed by the public to be very common at the commencement of true phthisis, is really not so. In most cases, the mischief has advanced some way before the bleeding, due probably to some degenerated blood-vessel, shows itself. And when we consider what really takes place in the catarrhal form of phthisis—that proliferation and caseation cause, or at any rate seem to cause, as the microscope shows us in such specimens as that diagram represents, impermeability and disappearance of the capillary vessels—the absence of any large amount of blood-spitting, I do not say